

NASA and Mt. St. Helens

On March 20, 1980, Washington's Mt. St. Helens volcano ended 123 years of dormancy with a single small earthquake, followed a week later by the first of several eruptions. The major eruption occurred on May 18 (below), when the volcano, exploding with the estimated force of a 10-megaton bomb, spewed clouds of gases and aerosols into the stratosphere to heights of almost 15 miles. During the rest of 1980 and into 1981, the volcano's ejecta was the subject of intense study by scientists from a score of organizations. NASA technology played an important part in the Mt. St. Helens aftermath, not only in scientific studies but also in disaster assessment and relief operations.

A technology demonstration of special interest, because of its applicability to future disasters, involved an innovative way of providing communications for emergency operations after much of the area's communications was quickly disabled. A particular problem was maintaining communications with the multitude of rescue ground crews and evacuation helicopters operating in the smoke-obscured area (top right).





A solution was provided through a coordinated effort involving local authorities, NASA, the Air Force, the National Guard, the National Association for Search and Rescue, the Federal Emergency Management Agency and General Electric Company (GE). The key elements of the emergency system were NASA's ATS-3 satellite (right) and a communications jeep developed by the USAF's 303rd Air Rescue and Recovery Service, March Air Force Base, California. Built by GE, the ATS-3 is capable of beaming to and receiving signals from small, simple antennas on the ground. The Air Force jeep was equipped with such an antenna and with additional equipment for sending or receiving signals over a broad range of radio frequencies. The jeep/ATS-3 handled a large portion of search/rescue and disaster relief communications during the critical early stage. For communications to points outside the disaster area, ATS-3 sent its signals to GE's Earth Station Laboratory, Rome, New York, which relayed them through commercial telephone lines.

In addition to the communications effort, NASA technology contributed to an assessment of the environmental impact of the Mt. St. Helens eruptions. Specially-instrumented aircraft operated by Ames Research Center, Johnson Space Center, Langley Research Center and Wallops Flight Center took samples of the volcanic material at various points over the United States and tracked the volcano's plume as far east as the

Atlantic Ocean and Europe. A NASA instrumented balloon penetrated the plume over Wyoming and measured stratospheric dust concentrations 400 to 1,600 times normal. NASA's Stratospheric Aerosol and Gas Experiment satellite also tracked the global spread of the volcanic "veil" from its orbital vantage point. The data from all these operations provided important input to NASA's ongoing studies of how the atmosphere reacts to aerosol injections caused by human activities or natural events, how these particles are transported around the world, and what effect they may have on local, regional and world climate.

